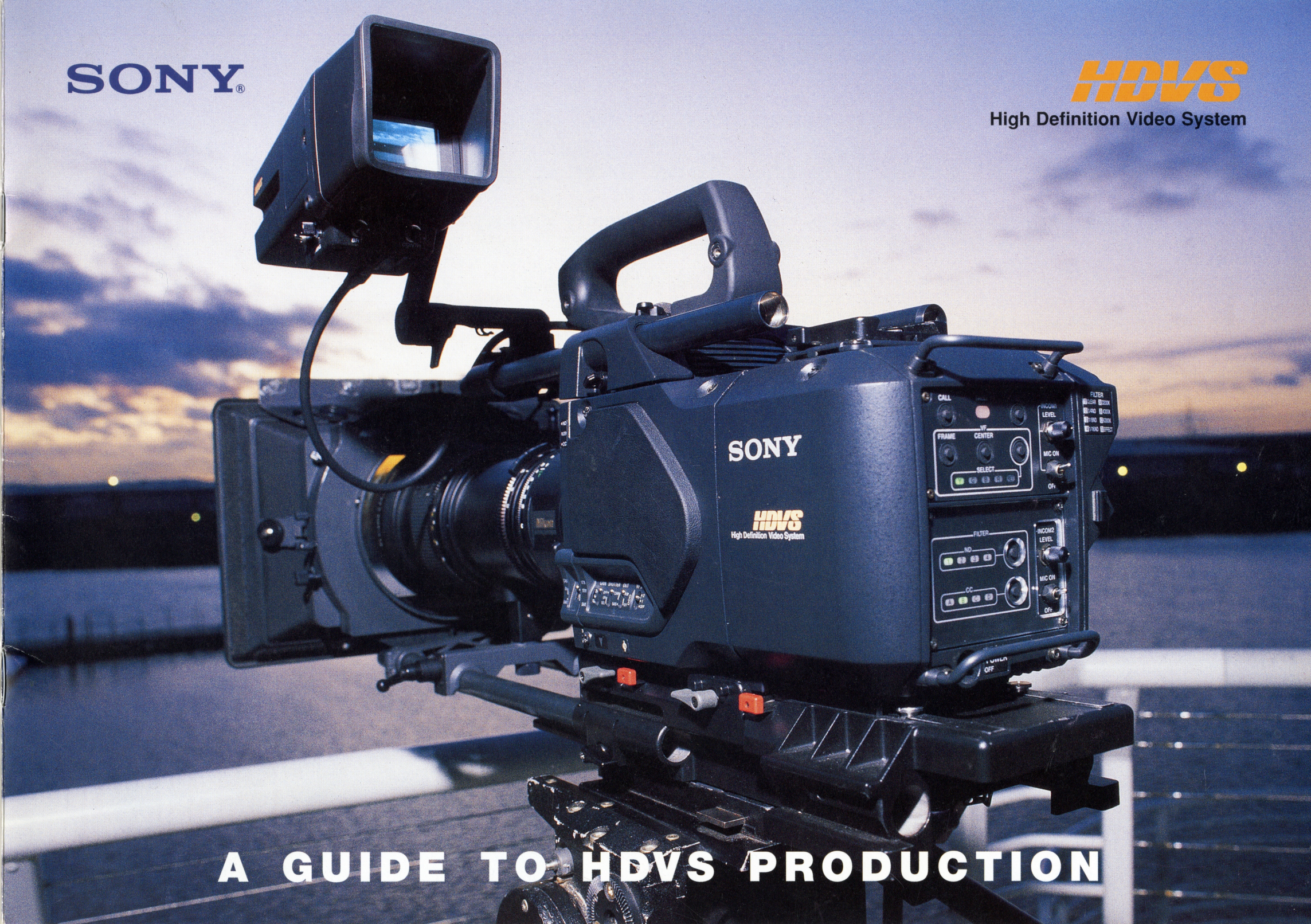
SONY

HDVS
High Definition Video System

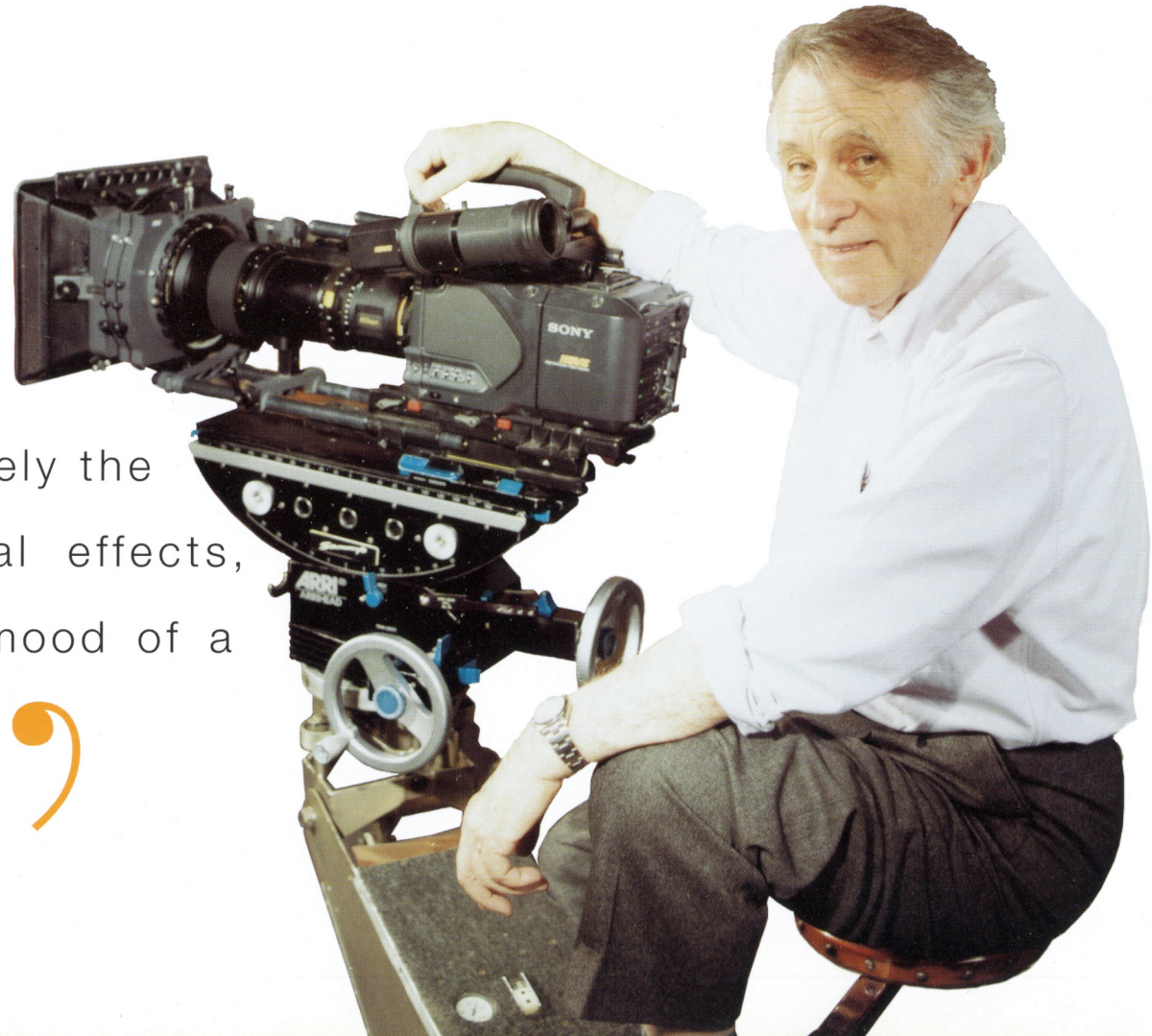


A GUIDE TO HDVS PRODUCTION

“When I saw high definition recently, I couldn’t believe that a video format could look that good or that close to film. As a cinematographer who has always tried to keep ahead of technological change in our industry, I am very excited about the creative possibilities that **HDVS** offers.

I see **HDVS** not only as a production medium in its own right but as a complementary medium to film. It demonstrates flexibility, namely the way it can be used for special effects, yet it can still capture the mood of a candlelit romantic drama.”

Freddie Francis



HDVS – WHAT IS IT?

High Definition Video System – **HDVS** is a video medium that offers an image quality comparable to 35mm film but with the immediacy of video and all the advantages of real-time special effects. This medium can be integrated with computer graphics and animation and is capable of conversion to any recognised production format. Stunning illusions can be created with the multi-layering capability of high definition images and seamless image compositing. **HDVS** is a recognised production standard* operating with 1125 scanning lines at a field frequency of 60Hz, eliminating the flicker associated with conventional 50Hz systems. The full bandwidth digital recording capability offers approximately five times the information normally found on D-1 together with eight tracks of digital audio for superb, CD quality sound. **HDVS** is like looking through a window. Compared to the standard video aspect ratio of 4:3, **HDVS** offers a breathtaking widescreen of 16:9 perspective. Furthermore, **HDVS** offers the possibility of producing images with the "look" that you want. That "look" can be as pure as the image in reality or moody and soft for a romantic or surreal drama, creating for others what perhaps has only previously been in someone's imagination. The production process and the crew environment have the same familiarity of a standard video or video-assist film shoot.

The cinematographer can stay in control at all times or benefit from assistance from the video engineer on set who essentially replaces the grader in the laboratory. **HDVS** is a digital motion picture stock. Consider **HDVS** to be an extremely low grain stock with an equivalent ASA rating of 575, that is appropriate for tungsten (3200°) or rated at 650 ASA equivalent for daylight (5400°) shooting. Furthermore, like film, it can be boosted by three stops. Shooting ratios can be lower than with film since what you see on the set is what you get in projection and an unacceptable take can always be erased and re-recorded. In fact, **HDVS**, like film or conventional video, is just another production tool for the cinematographer. The resulting wider pictures with improved image and sound quality means there is a new level of communication available for the creative mind.

SPECIFICATIONS	HDVS
Scanning lines	*1125*
Active lines	*1035*
Format	*16:9*
Field rate	*60Hz*
Bandwidth	*30MHz*
Audio	*up to 8 tracks digital*
Video signal to noise	*54dB*

*SMPTE 240M

***HDVS** OFFERS*

A BREATHTAKING

WIDESCREEN, 16:9

PERSPECTIVE

WITH DIGITAL MOTION PICTURE STOCK, ONE STOCK FITS ALL APPLICATIONS

THE CREATIVE POTENTIAL

HDVS is digital motion picture stock, simply said, it is just another image acquisition medium with the potential to challenge the creative imagination.

FLEXIBILITY

On land, under water, in the air, at top speed on a roller coaster ride or even in the nose cone of a jet fighter, wherever your production needs take you, **HDVS** can be trusted to perform. The camera can be hand held or mounted on a Steadicam™. In wide ranges of temperature and lighting conditions **HDVS** operates reliably. The performance of the HDC-500 camera is also proven in both Vectovision and Wescam mounts and on a conventional "machine-gun" mount. Focus, iris, filter wheel and electronic controls can all be adjusted remotely from inside the aircraft and HD video recording means there is no need to land for a magazine change.

The outdoor environment is often more challenging, but the skilled cinematographer will appreciate the sensitivity, gamma control and many other advanced features of the HDC-500.

LENSES

A variety of fixed and zoom lenses are available for the HD camera. The HD lens has an MTF (Modular Transfer Function or frequency versus resolution) curve specially designed to match the HD CCD (charge coupled device) or the light to electrical current converter. This differs from normal film lenses. The electronic circuitry is carefully designed to compensate for optical limitations in the HD lens and not a film lens. A film lens mount will adapt to the HD camera, however, the resulting image although not technically optimised may produce just the desired effect for a chosen production. The back focal distance is quite different to a film lens and an HD lens incorporates special compensation to correct for deficiencies within the prism in the camera head. There is also a difference between the horizontal angle of view of a 35mm film lens and an HD lens. The ratio is approximately 1.8:1 which means an 18mm film lens would require a 10mm HD lens.

LIGHTING

With **HDVS** the lighting cameraman will not need such a high a level, thereby offering the advantage of a quick set-up time. The high sensitivity of the camera, f8.0 at 2000 lux means the lighting requirements are less than with a conventional shoot. **HDVS** is a 60Hz (30 frame) based system and so will flicker with 50Hz discharge lighting in a similar way to 24 frame film. This can be overcome by running the generator at 60Hz, using flicker-free ballast or using the built-in electronic shutter. John Alonzo, cinematographer on the NBC **HDVS** production of *World War II – Then There Were Giants* said, "High Definition opens the doors for me to have more subtle lighting or to be very bold in lighting".

SPECIAL EFFECTS

Special effects are where **HDVS** excels. A good effect should be invisible to the viewer because if the methods used are detectable then the illusion is lost. Seamless and transparent multi-layering **HDVS** post production provides results that are convincingly real to the viewer. Many of the effects possible in real time are either not feasible using conventional methods or are extremely time intensive and very costly.

Blue screen works well on **HDVS**. In *World War II*, the Director of Photography John Alonzo said, " Blue screen work on **HDVS** is a lot easier than with film". Working with a blue screen can benefit the production not only by providing spectacular totally transparent results but also substantial cost savings on set design and transportation of high priced talent.

HDVS opens up an exciting diversity of creative options that until now have been limited by the quality of conventional television and the lack of immediacy of film.

IMAGE ACQUISITION

The HDC-500 camera incorporates CCD technology to guarantee results in a variety of shooting conditions. The HD camera demonstrates exceptional sensitivity. It is able to withstand vibration and shock and the variable electronic shutter is the equivalent of changing the shutter angle in a film camera.

The **CAMERA** is available in two configurations, studio or stand-alone/portable. In portable mode, the operator has less than 11Kgs to manipulate. The camera can be operated up to 100m from the camera adaptor and a full range of accessories is available,including viewfinders and shoulder mounts. Power consumption in the portable mode is approximately 55W.

In the studio configuration, the camera consists of a camera head, a camera adaptor (HDCA-350) and a CCU (camera control unit HDCO-350) together with the camera signal processor (HDCS-350) and viewfinders from 1.5 to 7 inches. For CCU operation an optical fibre transmission system is available for distances up to 1Km which includes six digital audio channels. The HDC-500 and accessories have a total power consumption of approximately 400W.

SENSITIVITY

The HDC-500 CCD camera has a sensitivity of f8.0 at 2000 lux. In low light levels this sensitivity can be further increased by selecting the appropriate gain (0, +6, +12, +18,). For example, a +6dB gain means a one-stop exposure index increase and in extreme conditions it is possible to shoot at +18dB or an equivalent 4600 ASA. Such sensitive response from the camera means that the shooting day can be extended. In terms of graininess, the HDC-500 at an ASA rating of 1200 gives a similar granularity to Kodak colour negative film EXR 5245 with a 50ASA rating (daylight) or 12ASA (tungsten).

TRANSFER CHARACTERISTICS

The contrast ratio of the HD CCD chip exceeds that of Kodak EXR colour negative film. With the CCU (Camera Control Unit) it is easy to adjust the transfer characteristics of the camera. Black gamma, overall gamma and the highlight capability can easily be regulated independently from each other. Combining this with the addition of optical filters, it offers the cinematographer infinite control to ensure the desired effect is achieved.

With **HDVS** it really is simple! Switch on the camera and shoot!

DIGITAL 'PERFORATIONS' GUARANTEE ABSOLUTE IMAGE STABILITY AND THE TOTAL ABSENCE OF WEAVE OVER MANY DUPLICATIONS

HDVS RECORDING OPTIONS

The imaging device and recording medium are separate units since recording in **HDVS** currently offers a choice of recorders dependent on budget and shooting location.

The digital recorder offers uncompromised quality whereas the analogue component VTR provides the convenience of compact cassette recording.

The HDVS camera outputs three individual video signals representing the three fundamental colours;red, green and blue. To maintain optimum quality, the **HDVS** VTR records these signals as separate components, as opposed to the composite encoding commonly found in PAL and NTSC television systems.

Besides the camera image, the **HDVS** VTR records synchronous audio and timecode. The built-in time code generator will uniquely identify each image frame recorded. Production sound is recorded in digital format having been converted from the input analogue source. Both recorders have built-in editing capabilities and most importantly because they are video tape based over – recording is possible, giving savings in stock usage and costs.

***HDVS** RECORDS DIGITALLY UP TO 63 MINUTES OF HIGH DEFINITION IMAGES AND EIGHT TRACKS OF DIGITAL AUDIO*

THE DIGITAL RECORDER – HDD/HDDP-1000 offers the ultimate in high definition image recording quality. The VTR consists of two components: the image processor and a tape transport. These units require mains power with a combined power consumption of 1.75KW.

The tape transport uses open reels and records digitally up to 63 minutes of high definition images and eight tracks of digital audio. Tapes can be dubbed in the digital domain, producing an exact reproduction of the original image with no loss of quality. This "cloning" capability is ideal for providing safety copies of programme master recordings.

THE CASSETTE RECORDER – HDV-10 balances the requirement for a more portable cassette based system with a very acceptable image quality. The recorder is a single unit weighing only 50Kgs and is easily rack mounted for studio use. The cassette shell is slightly larger than a standard VHS cassette. In common with the digital recorder, the HDV-10 requires mains power although the power consumption is only 450W. However, for location productions where mains power is not provided, the VTR and the camera can powered from a 1.2KVA generator or two 12V car batteries in series with an inverter. For aerial photography it can be powered using the aircraft's power supply with the addition of an inverter (CAA or appropriate Department of Transport approval required).

The **HDL-5800 VIDEODISC PLAYER/RECORDER OR THE HDL-2000 VIDEODISC PLAYBACK** units are designed to playback both still and moving images using optical disc technology. They provide many convenient features such as single-frame recording, fast random access and slow/still or continuous playback.

DIGITAL MOTION PICTURE STOCK. The medium for recording **HDVS** is metal particle tape and is available in analogue cassette or one-inch digital open reel both with running time of 63 minutes.

Recordable HD VideoDiscs are available in CAV or CLV formats allowing for 3 minutes or 5400 still frames per side or 10 minutes and 18000 still frames per side respectively. Pre-stamped discs for the HDL-2000 can be played on the HDL-5800 by simply using the sleeve provided.

HDVS POST PRODUCTION

High definition productions enable producers to combine the highest quality of picture origination with a complete range of post production and distribution options. **HDVS** can be transferred to any recognised video format, either wide-screen or conventional 4:3 aspect ratio, or to film. HDVS post production capability is in Tokyo, California and the United Kingdom. Digital mix effects capability, Paintbox™, Ultimatte, computer graphics, primary and secondary colour correction, in fact all you need to create the final programme.

For the European market, **HDVS** can be down-converted to PAL with full motion compensation. This offers clients a convenient way in which to off-line their HD productions. **HDVS** can also be transferred to 1250 lines at 50Hz again with full motion compensation. Conversion to NTSC is handled easily either to 525 lines at 60Hz or with a drop field to 525 lines at 59.94Hz.

35mm film images can be transferred to HDVS using an HD telecine. PAL and NTSC images can also be up-converted to **HDVS** images, however, the resulting quality will not be optimised on the HD format as the original recorded material does not contain enough information to fully utilise the potential for **HDVS** image reproduction.

For programme distribution on either 35mm or 70mm film formats, producers can use the Sony Electron Beam Recorder – EBR. The resulting film provides extremely sharp clear pictures, excellent colour reproduction and good archiving as the master film is fine grain monochrome film stock. The EBR process involves focusing an electron beam onto the film surface. As the beam does not penetrate the film base there is no halation. Each frame of an **HDVS** image is scanned twice and the electron beam exposes the film frame with sequential red, green and blue components. The black and white film stock is then sent to the laboratory and an optical step printer fitted with Wratten filters is used to expose the negative master.

HDVS and film originated material can be intercut with relative transparency provided the original images are of the highest quality.

For programmes that require a final projection from film in 1:2.35 format there is no problem. Simply use the built-in 1:2.35 framing marks in the camera viewfinder and in post production the digital mix effects unit can be used to clip the horizontal portion and squeeze the image ready to be printed onto Super 35mm.

Cinematographers world-wide have only just started to explore the potential of high definition production. Once you or your clients try High Definition Video System you too will appreciate the benefits of its flexibility, productivity, and quality.

*LET **HDVS** BECOME*

PART OF YOUR WORLD.

NEED HELP?

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PARTICULAR PROJECT.

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